

CLAIMS

This listing of claims will replace all prior versions, and listings of claims in the application.

- 1-4. (Cancelled)
5. (Currently Amended) A method of generating a differentiated neural cell population from primate pluripotent stem cells comprising the following steps:
 - (a) expanding a culture of primate pluripotent stem cells;
 - (b) culturing the pluripotent stem cells to select for neuroprogenitor cells that are positive for nestin;
 - (c) sorting the nestin-positive neuroprogenitor cells for enrichment of NCAM-positive cells;
 - (d) differentiating the nestin-positive, NCAM-positive cells to generate a differentiated neural cell population by culturing the cells in a differentiation media which comprises TGF- β 3 or interleukin-1 β or both, wherein the differentiated neural cell population comprises at least about 60% dopaminergic neurons or at least about 30% serotonergic neurons.
6. (Original) The method of claim 5, wherein the pluripotent stem cells were derived using a laser ablation technique.
7. (Original) The method of claim 5, wherein the pluripotent stem cells are human embryonic stem cells.
8. (Original) The method of claim 7, wherein the human embryonic stem cells were derived using a laser ablation technique.

9. (Currently Amended) The method of claim 5, wherein the differentiated neural cell population comprises at least about 60% dopaminergic neurons and at least about 30% serotonergic neurons.
10. (Cancelled)
11. (Cancelled)
12. (Original) The method of claim 5, further comprising culturing the pluripotent stem cells of step (b) to form embryoid bodies.
13. (Original) The method of claim 12, wherein the embryoid bodies are cultured to select for neuroprogenitor cells that are positive for nestin.
14. (Original) The method of claim 5, wherein the neuroprogenitor cells that are positive for nestin are selected by culturing the pluripotent stem cells in serum-free medium.
15. (Original) The method of claim 14, wherein the serum-free medium is ITSFn serum-free defined medium.
16. (Original) The method of claim 14, wherein the serum-free medium comprises one or more soluble factors selected from the group consisting of insulin, sodium selenite, transferrin, and fibronectin.
17. (Original) The method of claim 16, wherein the serum-free medium comprises insulin, sodium selenite, transferrin, and fibronectin.
18. (Original) The method of claim 13, wherein the neuroprogenitor cells that are positive for nestin are selected by culturing the embryoid bodies in serum-free medium.
19. (Original) The method of claim 18, wherein the serum-free medium is ITSFn serum-free defined medium.

20. (Original) The method of claim 18, wherein the serum-free medium comprises one or more soluble factors selected from the group consisting of insulin, sodium selenite, basic fibroblast growth factor, transferrin, and fibronectin.
21. (Original) The method of claim 20, wherein the serum-free medium comprises insulin, sodium selenite, transferrin, and fibronectin.
22. (Original) The method of claim 21, wherein the neuroprogenitor cells comprise at least about 95% nestin-positive cells.
23. (Original) The method of claim 5, wherein the nestin-positive neuroprogenitor cells of step (c) are sorted to enrich for NCAM-positive cells by Magnetic Cell Sorting (MACS).
24. (Original) The method of claim 23, wherein the nestin-positive neuroprogenitor cells comprise at least about 50-60% NCAM-positive cells.
25. (Original) The method of claim 5, further comprising expanding the nestin-positive, NCAM-positive neuroprogenitor cells of step (c) in expansion medium.
26. (Original) The method of claim 25, wherein the expansion medium comprises one or more soluble factors selected from the group consisting of insulin, sodium selenite, transferrin, laminin, putrescine, progesterone, basic fibroblast growth factor (bFGF), epidermal growth factor (EGF), sonic hedgehog (SHH), fibroblast growth factor-8 (FGF-8), and brain derived neurotrophic factor (BDNF).
27. (Original) The method of claim 26, wherein the cells are grown in the expansion medium for 6-10 days.
28. (Original) The method of claim 26, wherein the cells are cultured and serially passed for one or more population doublings.

29. (Original) The method of claim 26, wherein the cells are cryopreserved in liquid nitrogen.
30. (Original) The method of claim 5, wherein the differentiation media comprises Neurobasal medium supplemented with fetal calf serum, B27, ascorbic acid, and N-acetyl cysteine.
31. (Original) The method of claim 5, wherein the differentiation media further comprises one or more differentiation agents selected from the group consisting of ascorbic acid, N-acetyl, cysteine glial cell line derived neurotrophic factor (GDNF), dibutyl-cyclic AMP (db-cAMP), brain derived neurotrophic factor (BDNF), neurturin, sonic hedgehog protein (SHH), and fibroblast growth factor-8 (FGF-8).
32. (Original) The method of claim 5, wherein the nestin-positive, NCAM-positive cells are grown in differentiation media for 30-50 days.
33. (Currently Amended) A method of generating dopaminergic neurons from neuroprogenitor cells, comprising enriching the neuroprogenitor cells for cells that are positive for nestin and positive for NCAM, and differentiating the nestin-positive, NCAM-positive cells to generate dopaminergic neurons by culturing the cells in the presence of TGF- β 3 or interleukin-1 β or both, wherein at least about 60% of the nestin-positive, NCAM-positive cells differentiate into dopaminergic neurons.
34. (Cancelled)
35. (Cancelled)
36. (Cancelled)
37. (Cancelled)

38. (Currently Amended) A method of generating serotonergic neurons from neuroprogenitor cells, comprising enriching the neuroprogenitor cells for cells that are positive for nestin and NCAM, and differentiating the nestin-positive, NCAM-positive cells to generate serotonergic neurons by culturing the cells in the presence of TGF- β 3 or interleukin-1 β or both, wherein at least about 30% of the nestin-positive, NCAM-positive cells differentiate into serotonergic neurons.
39. (Cancelled)
- 40-44. (Cancelled)